What is claimed is:

1. A switching power supply unit comprising:

a transformer;

a switching circuit provided on the primary side of the transformer;

a synchronous rectifier circuit provided on the secondary side of the transformer and having at least a rectifier transistor;

a rectifier-transistor driving circuit provided on the secondary side of the transformer and forming a first control signal synchronous with a switching operation of the switching circuit; and

a timing generating circuit which receives the first control signal for forming a second control signal which exceeds a threshold voltage of the rectifier transistor at a timing substantially equal to the timing that one edge of the first control signal is generated based on the first control signal and which falls below the threshold voltage of the rectifier transistor at a timing earlier by predetermined time than the timing the other edge of the first control signal is generated, and for supplying the resulting second control signal to the control electrode of the rectifier transistor.

2. The switching power supply unit as claimed in claim

1,

wherein the waveform of the first control signal is a waveform alternately repeating a first potential, a second potential and an intermediate potential between the first and second potentials,

wherein the one edge of the first control signal is defined by the timing the one edge varies from the first potential to the intermediate potential, and the other edge of the first control signal is defined by the timing the other edge varies from the intermediate potential to the first potential.

3. The switching power supply unit as claimed in claim 2, wherein during the interval the first control signal varies from the intermediate potential to the first potential after the first control signal varies from the second potential to the intermediate potential, the voltage of the second control signal falls below the threshold voltage of the rectifier transistor.

4. The switching power supply unit as claimed in claim 3, wherein the timing generating circuit including:

a first unit which receives the first control unit for forming an intermediate signal which varies from a first logical level to a second logical level in response to the one

edge of the first control signal and varies from the second logical level to the first logical level in response to the variation of the first control signal from the second potential to the intermediate potential; and

a second unit which receives the intermediate signal for forming the second control signal by providing a delay to the variation of the intermediate signal from the second logical level to the first logical level.

5. The switching power supply unit as claimed in claim 4, wherein the first unit including:

a divider circuit for dividing the first control signal;

a delay circuit for delaying the output signal of the divider circuit; and

a comparator for comparing the first control signal with the output signal of the delay circuit whereby to form the intermediate signal.

6. The switching power supply unit as claimed in claim 5, wherein the delay circuit including:

a first time-constant circuit for providing a delay to the one-directional variation of the output signal of the divider circuit; and

a second time-constant circuit for providing a delay to the reverse-directional variation of the output signal of the

divider circuit.

7. The switching power supply unit as claimed in claim 6,

wherein the time constant of the first time-constant circuit is set so that the potential of the output signal of the delay circuit rises above at least the intermediate potential at the timing that the first control signal varies from the second potential to the intermediate potential

wherein the time constant of the second time-constant circuit is set so that the potential of the output signal of the delay circuit falls below at least the intermediate potential at the timing the first edge of the first control signal is generated.

8. The switching power supply unit as claimed in claim 1, wherein the switching circuit is one selected from a half-bridge circuit, a full-bridge circuit, a push-pull circuit and an active clamping circuit.

9. A switching power supply unit comprising:

a switching circuit which is connected to an input power supply and has a first main switch and a second main switch which alternately conduct at intervals of dead time;

a first rectifier transistor for performing rectifying

operation during the interval that the second main switch remains non-conducting;

a second rectifier transistor for performing rectifying operation during the interval the first main switch remains non-conducting; and

a driving unit for driving the first and second rectifier transistors,

wherein the driving unit is used to supply an ON signal to the control electrode of the first rectifier transistor over the substantially whole period of first dead time to be inserted and also to supply the ON signal to the electrode of the second rectifier transistor for a part of period of the first dead time when the conducting main switch is switched from the second main switch to the first main switch,

wherein the driving unit is used to supply the ON signal to the control electrode of the second rectifier transistor over the substantially whole period of second dead time to be inserted and also to supply the ON signal to the electrode of the first rectifier transistor for a part of period of the second dead time when the conducting main switch is switched from the first main switch to the second main switch.

10. The switching power supply unit as claimed in claim 9,

wherein a part of period of the first dead time is a

consecutive period including the timing of starting the first dead time,

wherein a part of period of the second dead time is a consecutive period including the timing of starting the second dead time.

11. A switching power supply unit comprising:

a first switching element and a second switching element which are provided on the primary winding side of a transformer and connected to a power supply in series;

a converter having a first synchronous rectifying switch element and a second synchronous rectifying switch element which are connected to the secondary winding side of the transformer in series; and

a driving circuit for controlling the operation of the first and second switching elements and generating a first control signal and a second control signal both having a dead time period in which the first and second switching elements are not conducting.

12. The switching power supply unit as claimed in claim 11, wherein the dead time of the first and second control signals generated by the driving circuit is a period or longer resulting from subtracting a commutation period due to leakage inductance from the transformer from delay time in the

operation of the synchronous rectifying switch element and is a period shorter than time resulting subtracting the commutation period from a half period of the first control signal.

13. The switching power supply unit as claimed in claim 11, wherein an inductor is provided in one input portion on the primary winding side of the transformer, the inductor being used for causing the first and second switching elements to carry out soft switching during the dead time period.

14. The switching power supply unit as claimed in claim 11, wherein a preceding-stage converter including at least one switching element is provided at the preceding stage of the converter.

15. The switching power supply unit as claimed in claim 14, wherein the converter has a fixed duty and the preceding-stage converter performs pulse width control.

16. The switching power supply unit as claimed in claim 11, wherein the converter is a half-bridge converter.

17. The switching power supply unit as claimed in claim 16, wherein the half-bridge converter includes:

a half-bridge circuit having a first capacitor and a second capacitor provided on the primary winding side of the transformer and a first switching element and a second switching element which are connected to the power supply in series; and

a self-drive type synchronous rectifying circuit having a first and a second synchronous rectifying switch element connected to the secondary winding side of the transformer in series.

18. A switching power supply unit comprising:

a transformer;

a first converter and a second converter which are connected between a supply input terminal and the primary winding of the transformer in series;

an output circuit connected to the secondary winding of the transformer; and

a control circuit for controlling the operation of the first and second converters,

wherein the control circuit is used for controlling the first converter in terms of duty and also controlling the second converter in terms of frequency.

19. The switching power supply unit as claimed in claim 18, wherein the control circuit controls the duty of the first

converter according to a present output voltage outputted from the output circuit, and controls the operating frequency of the second converter according to a set value regardless of the present output voltage.

20. The switching power supply unit as claimed in claim 18, wherein the control circuit controls the second converter so that dead time is made constant, regardless of the operating frequency.

21. The switching power supply unit as claimed in claim 20,

wherein the output circuit includes a self-drive type synchronous rectifier circuit formed with rectifier transistors is contained,

wherein the dead time is set substantially equal to an interval resulting from subtracting a commutation period due to leakage inductance from the transformer from delay time in the operation of the rectifier transistors.

22. The switching power supply unit as claimed in claim 18, wherein the first converter is a buck converter circuit and the second converter is a half-bridge converter circuit.